Generative adversarial network for road damage detection

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Abstract

Machine learning can produce promising results when sufficient training data are available; however, infrastructure inspections typically do not provide sufficient training data for road damage. Given the differences in the environment, the type of road damage and the degree of its progress can vary from structure to structure. The use of generative models, such as a generative adversarial network (GAN) or a variational autoencoder, makes it possible to generate a pseudoimage that cannot be distinguished from a real one. Combining a progressive growing GAN along with Poisson blending artificially generates road damage images that can be used as new training data to improve the accuracy of road damage detection. The addition of a synthesized road damage image to the training data improves the F■measure by 5% and 2% when the number of original images is small and relatively large, respectively. All of the results and the new Road Damage Dataset 2019 are publicly available (https://github.com/sekilab/RoadDamageDetector).